What Is Claimed Is:

1. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber comprising the steps of:

providing a process chamber equipped with a wafer platform and a wafer backside heating and cooling device;

positioning a wafer having a passivation layer and a patterned polyimide photoresist layer on top on said wafer platform;

generating an O_2 plasma in said chamber conducting a descum process;

flowing a heated inert gas onto a backside of said wafer conducting a hot bake process; and

flowing a cooling inert gas onto said wafer backside and an etchant into said chamber conducting a dry etch process for a via opening on said wafer.

2. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said descum process for a time period of less than 30 sec.

3. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said hot bake process for a time period of at least 20 sec.

4. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said hot bake process by flowing a heated He gas onto said backside of the wafer.

5. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said hot bake process by flowing a heated He gas onto said backside of the wafer at a pressure of at least 10 mTorr.

6. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said dry etch process for a time period of at least 1 min.

7. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said dry etch process while flowing cooling inert gas of He at a pressure of at least 10 mTorr.

8. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said descum process at a chamber pressure of less than 1500 mTorr and a plasma power of less than 150 W.

9. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of conducting said descum process at an O_2 flow rate of less than 40 sccm and an inert gas flow rate of less than 400 sccm.

10. A method for in-situ descum/hot bake/dry etch a polyimide photoresist layer in a single process chamber according to claim 1 further comprising the step of providing said process chamber with a plasma generating means.

11. A process chamber for conducting in-situ a descum, a hot bake and a dry etch process sequentially in the same chamber comprising:

a chamber cavity capable of being evacuated to a pressure not higher than 1 Torr;

a wafer platform for holding a wafer thereon;

a plasma generating means for generating a plasma inside said chamber cavity;

a gas inlet for flowing a reactant gas into said chamber cavity;

a cooling means for flowing a cooled fluid onto a backside of said wafer; and

a heating means for flowing a heated fluid onto said backside of the wafer.

12. A process chamber for conducting in-situ a descum, a hot bake and a dry etch process sequentially in the same chamber according to claim 11, wherein said wafer platform is an electrostatic chucking (ESC) device.

13. A process chamber for conducting in-situ a descum, a hot bake and a dry etch process sequentially in the same chamber according to claim 11, wherein said plasma generating means is an O_2 plasma generating means.

14. A process chamber for conducting in-situ a descum, a hot bake and a dry etch process sequentially in the same chamber according to claim 11, wherein said plasma generating means is a plasma etching means.

15. A process chamber for conducting in-situ a descum, a hot bake and a dry etch process sequentially in the same chamber according to claim 11, wherein said cooling means flows a cooled inert gas onto a backside of said wafer.

16. A process chamber for conducting in-situ a hot bake and a dry etch process sequentially in the same chamber according to claim 11, wherein said cooling means flows a cooled He gas onto a backside of said wafer.

17. A process chamber for conducting in-situ a hot bake and a dry etch process sequentially in the same chamber according to claim 11, wherein said heating means flows a heated He gas onto said backside of the wafer.

18. A process chamber for conducting in-situ a hot bake and a dry etch process sequentially in the same chamber according to claim 11 further comprising a fluid outlet conduit for flowing said cooled or heated fluid away from said backside of the wafer.